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		Application Number	10/540,017
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		First Named Inventor	Maerky, Christophe
		Art Unit	2832
		Examiner Name	Ramon M. Barrera
Total Number of Pages in This Submission	16	Attorney Docket Number	4005/0261PUS1

ENCLOSURES *(Check all that apply)*

☐ Fee Transmittal Form	☐ Drawing(s)	☐ After Allowance communication to (TC)
☒ Fee Attached	☐ Licensing-related Papers	☐ Appeal Communication to Board of Appeals and Interferences
☐ Amendment / Reply	☐ Petition	☒ Appeal Communication to TC (Appeal Notice, Brief, Reply Brief)
☐ After Final	☐ Petition to Convert to a Provisional Application	☐ Proprietary Information
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

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Date	June 10, 2008	Reg. No.	32334

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Attorney Docket No.: 4005/0261PUS1 PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s): Christophe Maerky	Conf. No.: 8869
Application No.: 10/540,017	Art Unit: 2832
Filed: 3 Oct 2006	Examiner: Ramon M. Barrera
Title: ELECTROMAGNETIC VALVE ACTUATOR WITH A PERMANENT MAGNET	

MS APPEAL BRIEF PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

APPEAL BRIEF

As required under §41.37(a), the present brief is being filed within two months of the Notice of Appeal which was filed in this application on April 10, 2008, and is in furtherance of this Notice of Appeal.

The fees required under §41.20(b)(2) are dealt with in the accompanying Transmittal of Appeal Brief.

This brief contains items under the following headings as required by 37 C.F.R. §41.37 and MPEP §1206:

I. **Real Party in Interest**

II. **Related Appeals and Interferences**

III. **Status of Claims**

IV. **Status of Amendments**

I. Real Party in Interest

The real party in interest for this appeal is Valeo Systemes de Controle Moteur of Osny France, by Assignment as recorded at reel 018342/frame 0065.

II. Related Appeals Interferences and Judicial Proceedings

There are no other appeal, interferences or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. Status of Claims

a. Total Number of Claims in Application

There are two claims pending in this application.

b. Current Status of Claims

1. Claims canceled: none.
2. Claims withdrawn from consideration but not canceled: none.
3. Claims pending: 1-2.
4. Claims allowed: none.
5. Claims rejected: 1-2

c. Claims on Appeal

The claims on appeal are claims 1-2.

IV. Status of Amendments

Applicants filed an Amendment after final rejection on February 11, 2008. In the Advisory Action of March 19, 2008, the Examiner indicated that the Amendment will be entered for

purposes of appeal. The Examiner also indicated that the 35 U.S.C. §112 second paragraph rejection was overcome by the Amendment.

In addition to this Amendment, Applicants conducted an interview with the Examiner on January 30, 2008. The Interview Summary was issued by the Examiner on February 11, 2008. No agreement was reached during this interview.

V. Summary of Claimed Subject Matter

a. In General

The present invention relates to an electromagnetic valve actuator for use in a cylinder head of an engine (pg. 3, ln. 1). The actuator includes a coil 20 and core portion 17 in conjunction with a permanent magnet 22 (pg. 3, lns. 15-27).

b. Claim 1

An electromagnetic valve actuator 10 (FIG. 1, pg. 3, ln. 3) includes an actuator member 11, 14 (FIG. 1, pg. 3, ln. 3 and 11). The actuator member moves under the effect of a resilient member 12, 13 (FIG. 1, pg. 3, lns. 8-10). At least one coil 20 (FIG. 1, pg. 3, lns. 22-24) and at least one permanent magnet 22 (FIG. 1, pg. 3, lns. 25-29) are arranged to hold the actuator member in one position when the coil is not power (FIG. 2, pg. 4, lns. 24-28). The coil 20 is associated with a core 16 having two portions 17 (FIG. 1, pg. 3, lns. 11-16). The two portions have first facets 21 in contact with the permanent magnet and second facets with an airgap e which is smaller than a thickness H of the permanent magnet 22 (FIG. 1, pg. 3, lns. 25-29). The airgap forms an angle with the direction of magnetization of the permanent

magnet (FIG. 1, pg. 5, lns. 28-32, pg. 6, lns. 2-7). The permanent magnet 22 is in contact with the first facets over an entire surface of the facets (pg. 3, lns. 25-27).

c. Claim 2

Claim 2 depends from claim 1 and further describes the electromagnetic actuator where the airgap e forms a right angle with the direction of magnetization of the permanent magnet 22 (FIG. 2, pg. 5, lns. 28-32).

VI. Grounds of Rejection to be Reviewed on Appeal

The Examiner rejected claims 1 and 2 under 35 U.S.C. §103 as being obvious over Binder Magnete (DE 3928066) in view of Kubach (U.S. Patent 4,546,339) or Boyd (U.S. Patent 3,792,390). It is understood that this rejection involves the primary reference in combination with either of the secondary references so that this is a two-way rejection where the secondary reference may be either of two patents.

The Examiner states that the primary reference, Binder Magnete, shows an electromagnetic valve actuator including an actuator member 12, a resilient member 24, a coil 13, at least one permanent magnet 10 for the coil having two portions 15, 15a with first facets in contact with the permanent magnet in an airgap 9 of a size that is smaller than the thickness of the permanent magnet. The Examiner admits that this reference does not show an airgap of a size that is much smaller than the thickness of the permanent magnet. The Examiner relies on either of the secondary references to show an airgap that is much smaller than the thickness of the permanent magnet.

VII. Argument

a. Rejection of Claim 1 under 35 U.S.C. §103 as being obvious over Binder Magnete in view of Kubach or Boyd

The Examiner mainly relies on the Binder Magnete reference to show an electromagnetic valve actuator having an actuator member 12, a resilient member 24, a coil 13, a permanent magnet 10, a coil with two portions 15, 15a with first facets in contact with the permanent magnet in airgap 9. The Examiner relies on the secondary references to show that the airgap is a size that is much smaller than the thickness of the permanent magnet. The Examiner feels it would have been obvious to substitute an airgap of a smaller size.

First, in the Binder Magnete reference the relative sizes of the airgap and permanent magnet do not appear to be specified. FIGS. 1 and 2 show both elements as being of a size roughly comparable to each other. The Examiner feels that it would be obvious change the size of the airgap to be smaller in view of the secondary references. Applicants submit that making the airgap smaller would not be obvious to one of ordinary skill in the art.

Applicants do not question that the secondary references show an airgap which has a smaller size than the thickness of the associated permanent magnet. However, Applicants believe that it would not be obvious to modify the airgap in the primary reference since it would have adverse effects to the operation of the device. Likewise, there would be no motivation for one skilled in the art to make such a change due to these adverse effects.

In the Binder Magnete device, the armature 12 is movable in an up and down direction in order to drive rod 17 and accordingly arm 20, which interacts with rod 28 to move the valve 30 to either open or close. The armature 12 is driven downwardly by the first magnet system including coil 11 and core 16. A permanent 10, coil 13, internal pole 14, yoke 15 and external pole 15a is used to close the valve. When it is desired to open the valve, the coil 13 is actuated in a direction so that the magnetic field of the permanent magnet is neutralized. Thus, the fields of the permanent magnet and the coil 13 are opposite to each other so that the second magnet system has little effect on the armature. At the same time, the coil 11 is actuated to pull the armature downwardly and open the valve. Thus, the purpose of the coil 13 is to neutralize the permanent magnet.

In order for this to occur, the magnetic field should travel in a circle through poles 14 and 15a and yoke 15. The field formed should be in the same shape as the field from the permanent magnet but in the opposite direction, as much as possible. As a result, the two fields cancel. If the airgap is made smaller, as suggested by the Examiner, the direction of the field of the coil 13 will change. That is, the field will tend to short circuit below the position of the permanent magnet and does not provide a field which is directly opposite that of the field of the permanent magnet. This would be detrimental to the operation of the device since it is less likely to neutralize the magnetic field of the permanent under these circumstances. This is an important function since this neutralization makes it possible for the coil 11 to move the

armature in a downward direction. Applicants submit that it would not be obvious to make the airgap smaller since it would be detrimental to the operation of the device.

This may be contrasted with the operation of the present device. In the present device as described on pg. 5, especially lns. 22-27, the airgap must be large enough to prevent the flux from the permanent magnet looping through the second facets. That is, it must be large enough so the permanent magnet does not short circuit above the coil and does not operate with the armature at all. On the other hand, it must be small enough to reduce the flux loss of the coil. In the present invention, it is important that the field from the coil not go through the permanent magnet since this acts to demagnetize the permanent magnet. This is not the case in the reference where it is desirable that the field be opposite to that of the permanent magnet so that it is neutralized.

In the arrangement shown in FIG. 3 of the application, when the valve is opened, the coil is driven in the opposite direction so that the field is opposite to that of the permanent magnet so that it is canceled and the armature returns under the action of the springs 12 and 13. Thus, while the present invention needs an airgap which is smaller than the permanent magnet, this is not necessarily a desirable feature in the primary reference. Accordingly, Applicants submit that it would not be obvious to modify this device as suggested by the Examiner since this would have adverse effects on the operation of the device. Likewise, Applicants submit that there is no motivation for doing this since it contradicts the general operation of the device.

Further, Applicants submit that even the combination of references does not teach claim 1 as presently described. The Examiner has equated the two portions of the core as yoke 15 and external pole 15a. However, claim 1 specifically states that the two portions have two facets in contact with the permanent magnet and that they have second facets that present between them the airgap. While yoke 15 and external pole 15a have a first facet in contact with permanent magnet, they do not have a second facet which present between them an airgap. The airgap is formed between external pole 15a and the internal pole 14. Thus, the various parts of the Binder Magnete device do not match the particular of the portions of the core as described in claim 1. Accordingly, Applicants submit that claim 1 is also allowable since this feature is not taught by the references.

b. Rejection of Claim 2 under 35 U.S.C. §103 as being obvious over Binder Magnete in view of Kubach or Boyd.

Claim 2 depends from claim 1 and accordingly is allowable for the same reasons recited above. Further, claim 2 describes that the angle between the direction of magnetization and the airgap is a right angle. Thus, Applicants submit that claim 2 is allowable for the same reasons recited above in regard to claim 1.

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Conclusion

In view of the above, Applicants submit that the rejection of the Examiner is in error.

Applicants respectfully request that the rejection of the Examiner be removed.

Respectfully submitted,

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DATE: June 10, 2008

VIII. Claims Appendix

1. An electromagnetic valve actuator comprising an actuator member movable under the effect of a resilient member and of at least one coil , and at least one permanent magnet arranged to hold the actuator member in at least one of its extreme positions against the resilient member when the coil is not powered, the coil being associated with a core comprising two portions having respective first facets in contact with the permanent magnet and respective second facets that present between them an airgap of size that is smaller than a thickness of the permanent magnet, said airgap forming an angle with the direction of magnetization of the permanent magnet , wherein said permanent magnet is in contact with said first facets over an entire surface of said first facets.

2. An electromagnetic actuator according to claim 1, wherein the airgap (e) forms a right angle with the direction (25) of magnetization of the permanent magnet (22).

IX. Evidence Appendix

In the Amendment of February 11, 2008, Applicants submitted a partial translation of col. 3, lns. 31-66 of the primary reference which is in the German language. The submission of the German translation was agreed on during the interview of January 30, 2008. The Amendment of February 11, 2008 was entered by way of the Advisory Action of March 19, 2008 and accordingly the translation, which was a part of this Amendment was similarly entered by the Examiner. A copy of this partial translation is attached hereto.

English translation of DE 39 28 066 column 3 lines 31-66

Opposite to the first magnet system comprising of the ring-shaped magnet coil 11 and the pot-shaped core 16, is the second magnet system 10, 13, 14, 15, 15a, designed for closing the valve. It consists of a ring-shaped permanent magnet 10, which is contained lateral to the valve of an external pole 15a and opposite to yoke 15. The armature rod 17 is carried through a cylindrical internal pole 14 being contained coaxial to yoke 15. On the face of the second magnet system lateral to the armature, a ring shaped bucking coil 13 is designed between the magnetic gap 9 and the external pole 15a and the internal pole 14. The magnetic field of the permanent magnet 10 can be neutralized by the bucking coil 13 for trapping the armature 12 by the smaller dimensioned magnet system 11, 16 to activate the opening of the valve. The diameter of the permanent magnet 10 due to physical reasons is greater than the diameter of electromagnet consisting of the magnet coil 11 and the core 16. In order to keep the diameter of the permanent magnet as small as possible the internal pole 14 contains a magnetic raw material with a maximum saturation flux density e.g. made from a 50% ferric-cobalt alloy. Yoke 15 and the external pole 15a consist of a more advantageous evolvent form of glad sheets with a constant thickness. Yoke 15 and external pole 15a show a greater diameter at the bezel of the permanent magnet 3, narrowing conical with gradual diminution of cross-section such that the outside diameter of the external pole 15a is a little smaller than the diameter of the pot-shaped core 16. This leads to the result of an advantageous weight of the armature, resulting in an improved response of a rotational frequency and in the reduction of the mechanical wear.

X. Related Proceedings Appendix

There are no related proceedings.